

$$\text{الف) } \tan \frac{11\pi}{8} + \sin \frac{10\pi}{8} \times \cos \frac{13\pi}{8} \Rightarrow 1 + \left(-\frac{\sqrt{2}}{2}\right) \left(-\frac{\sqrt{2}}{2}\right) = \boxed{\frac{1}{2}}$$

$$\tan \frac{11\pi}{8} \times \frac{180^\circ}{\pi} = 157.5^\circ \rightarrow 360^\circ + 135^\circ \Rightarrow \tan 135^\circ = -1$$

$$\sin \frac{10\pi}{8} \times \frac{180^\circ}{\pi} = 135^\circ \rightarrow 360^\circ + 135^\circ \Rightarrow \sin 135^\circ = \frac{\sqrt{2}}{2}$$

$$\cos \frac{13\pi}{8} \times \frac{180^\circ}{\pi} = 157.5^\circ \rightarrow 360^\circ + 122.5^\circ \Rightarrow \cos 122.5^\circ = -\frac{\sqrt{2}}{2}$$

$$\text{ب) } \frac{14\pi}{9} = 2\pi + \frac{2\pi}{9}, \quad \frac{11\pi}{9} = \pi - \frac{\pi}{9}, \quad \frac{10\pi}{9} = \pi + \frac{\pi}{9}$$

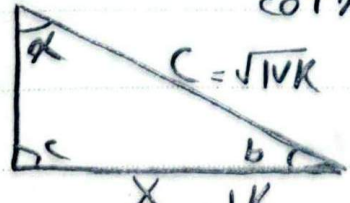
$$\tan\left(\frac{14\pi}{9}\right) = \tan\left(\frac{2\pi}{9}\right) = \tan\left(\pi - \frac{\pi}{9}\right) = -\tan\left(\frac{\pi}{9}\right) = -\frac{\sqrt{3}}{3}$$

$$\sin\left(\frac{11\pi}{9}\right) = \sin\left(-\frac{\pi}{9}\right) = -\sin\left(\frac{\pi}{9}\right) = -\frac{\sqrt{3}}{3}$$

$$\cos\left(\frac{10\pi}{9}\right) = \cos\left(\pi + \frac{\pi}{9}\right) = -\cos\left(\frac{\pi}{9}\right) = -\frac{1}{2}$$

$$\left(-\frac{\sqrt{3}}{3}\right) \left(-\frac{\sqrt{3}}{3}\right) + \left(-\frac{1}{2}\right) = \frac{1}{3} - \frac{1}{2} = \boxed{-\frac{1}{6}}$$

20 $\cot \alpha = \frac{1}{2} \Rightarrow \cos \alpha = \frac{1}{\sqrt{5}} \quad \sin \alpha = \frac{2}{\sqrt{5}}$



$$\frac{EK}{1K} + \frac{1K}{2K} = \frac{\sqrt{10}K}{2K}$$

$$\sin \alpha = \frac{2}{\sqrt{10}} \quad \cos \alpha = \frac{1}{\sqrt{10}} \Rightarrow \frac{\frac{2}{\sqrt{10}} - \frac{1}{\sqrt{10}}}{\frac{2}{\sqrt{10}} + \frac{1}{\sqrt{10}}} = \frac{\frac{1}{\sqrt{10}}}{\frac{3}{\sqrt{10}}} = \boxed{\frac{1}{3}}$$

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$$\frac{\frac{r \cos x - \sin x}{\sin x}}{\frac{\cos x + \sin x}{\sin x}} = \frac{r \cot x - 1}{\cot x + 1} = \frac{r(\epsilon) - 1}{\epsilon + 1} = \boxed{\frac{11}{5}} \quad -2$$

$$\sin \alpha = r \cos \alpha \Rightarrow \frac{\sin \alpha}{\cos \alpha} = \frac{r \cos \alpha}{\cos \alpha} = \boxed{\tan \alpha = r} \quad -3$$

$$1 + \tan^2 \alpha = \frac{1}{\cos^2 \alpha} \Rightarrow \left(1 + r = \frac{1}{\cos \alpha}\right)^2 = 1 + \epsilon = \frac{1}{\cos^2 \alpha}$$

$$\Rightarrow 0 = \frac{1}{\cos^2 \alpha} \Rightarrow \cos^2 \alpha = \frac{1}{5} \Rightarrow \cos \alpha = \boxed{\pm \frac{1}{\sqrt{5}}} \quad 10$$

دلیل ربع سوم بودن جواب برابر با $-\frac{1}{\sqrt{5}}$ و $-\frac{\sqrt{5}}{5}$ می باشد.

$$\cos\left(\frac{11\pi}{\epsilon} + \alpha\right) = \cos\left(2\pi + \frac{3\pi}{\epsilon} + \alpha\right) = \cos\left(\frac{3\pi}{\epsilon} + \alpha\right) \quad -5 \quad 15$$

$$\Rightarrow \cos\left(\frac{3\pi}{\epsilon}\right) \cos \alpha - \sin \frac{3\pi}{\epsilon} \sin \alpha = \left(\frac{\sqrt{3}}{2}\right)\left(\frac{1}{\sqrt{5}}\right) - \left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{10}\right) = \boxed{\frac{3}{5}}$$

$$\Rightarrow \cos^2 \alpha + \sin^2 \alpha = 1 \Rightarrow \frac{r}{10} + \cos^2 \alpha = 1 \Rightarrow \cos^2 \alpha = \frac{9}{10}$$

$$\cos \alpha = -\frac{\sqrt{9}}{10\sqrt{2}}$$

جواب برابر با $-\frac{3}{10}$ و $-\frac{\sqrt{2}}{10}$ می باشد.

$$\tan^2 \theta + 1 = \frac{1}{\cot^2 \theta} \Rightarrow \left(\frac{1}{v}\right)^2 + 1 = \frac{\Delta_0}{\epsilon_0} \quad \text{4- صفت ب}$$

$$\cos^2 \theta = \frac{\epsilon_0}{\Delta_0} \Rightarrow \cos \theta = \frac{v}{\Delta \sqrt{r}} = \frac{v \sqrt{r}}{1_0}$$

$$\sin \theta = \tan \theta \times \cos \theta = \frac{1}{\cancel{v}} \times \frac{v}{\Delta \sqrt{r}} = \frac{1}{\Delta \sqrt{r}} = \frac{\sqrt{r}}{1_0}$$

$$\sin\left(\frac{\Delta \pi}{\epsilon} + \alpha\right) = \sin\left(\frac{\Delta \pi}{\epsilon}\right) \cos \theta + \cos\left(\frac{\Delta \pi}{\epsilon}\right) \sin \theta =$$

$$\left(-\frac{\sqrt{r}}{r}\right)\left(\frac{v \sqrt{r}}{1_0}\right) + \left(-\frac{\sqrt{r}}{r}\right)\left(\frac{\sqrt{r}}{1_0}\right) = \boxed{-\frac{\epsilon}{\Delta}}$$

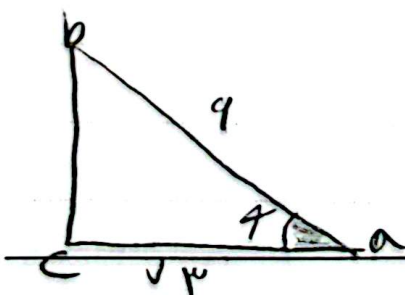
$$r \sin^2 \alpha + \cos^2 \alpha = \frac{\epsilon}{r} \Rightarrow r \sin^2 \alpha + 1 - \sin^2 \alpha = \frac{\epsilon}{r} \quad - \Delta$$

$$\sin^2 \alpha + 1 = \frac{\epsilon}{r} \Rightarrow \sin^2 \alpha = \frac{1}{r} \quad \cos^2 \alpha = 1 - \sin^2 \alpha \Rightarrow$$

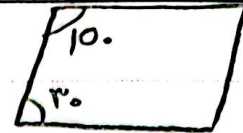
$$1 - \frac{1}{r} = \frac{r}{r} \quad \tan^2 \alpha = \frac{\sin^2 \alpha}{\cos^2 \alpha} = \frac{\frac{1}{r}}{\frac{r}{r}} = \boxed{\frac{1}{r}}$$

$$\frac{1}{r} \times ab \times ac \times \sin \theta = \frac{1}{r} \times \cancel{a} \times \sqrt{r} \times \sin \theta = \epsilon, \theta \quad - \theta$$

$$\sqrt{r} \times \sin \theta = r \Rightarrow \sin \theta = \frac{r}{\sqrt{r}} \quad \boxed{\theta = 4. \circ 12.}$$



$$a = rK \quad , \quad b = rK \quad s = \delta r$$



-V

$$s = ab \sin \theta \Rightarrow \delta r = (rK)(rK) \sin 10^\circ = \sin(10^\circ - r_0) =$$

$$\sin(r_0) = 0.17 = \sin(10^\circ) \quad \delta r = \frac{rK}{r} \times 0.17 \Rightarrow \delta r = rK$$

$$K = 17 \Rightarrow K = r\sqrt{r} \Rightarrow a = rK = 4\sqrt{r}$$

$$b = rK = 4\sqrt{r} \quad p = r(a+b) \Rightarrow p = r(4\sqrt{r} + 4\sqrt{r})$$

$$\Rightarrow p = r(8\sqrt{r}) = \boxed{P_{10} = r_0 \sqrt{r}}$$

$$S_{ABC} = \frac{1}{r} \times AB \times AC \times \sin A = \frac{1}{r} \times a \times V \times \sin A = \frac{r_0 \sin A}{r} = 1$$

$$S_{ADE} = \frac{1}{r} \times AD \times AE \times \sin A = \frac{1}{r} \times V \times r \times \sin A = \frac{r \sin A}{r} = 15$$

$$S_{ABC} - S_{ADE} = 1, \quad \Rightarrow \quad \frac{r_0 \sin A - r \sin A}{r} = 1, \quad \Rightarrow$$

$$V \sin A = r, \quad \Rightarrow \quad \sin A = \frac{r, 0}{V} = \sin A = \frac{1}{r} \Rightarrow A = 10^\circ$$

$$\frac{\sin A}{\cos A} = \frac{\sin r_0}{\cos r_0} = \frac{\frac{1}{r}}{\frac{\sqrt{r}}{r}} = \boxed{\frac{1}{\sqrt{r}}}$$

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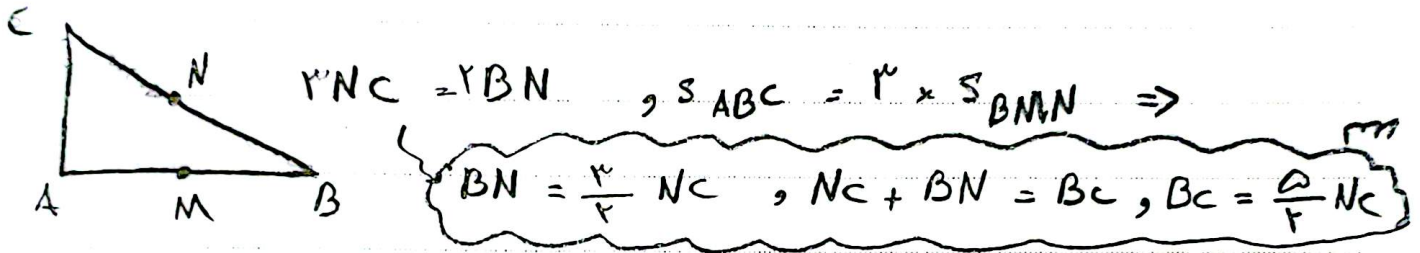
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$$S_{BMN} = \frac{1}{r} \times BM \times BN \times \sin B$$

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$$S_{ABC} = \frac{1}{r} \times AB \times BC \times \sin B$$



$$\frac{1}{r} \times AB \times BC \times \sin B = \frac{1}{r} \times r \times BM \times BN \times \sin B \Rightarrow$$

$$AB \times BC = r \times BM \times BN \Rightarrow \frac{BN}{BC} = \frac{\frac{r'}{r} NC}{\frac{r}{r'} NC} = \frac{r'}{r}$$

$$\frac{1}{r} = \frac{r'}{r} \times \frac{BM}{AB} \Rightarrow \frac{1}{r} \times \frac{r}{r'} = \frac{BM}{AB} \Rightarrow$$

$$\frac{r}{r'} = \frac{BM}{AM + BM} \Rightarrow rBM = \delta AM + \delta BM = \epsilon BM = \delta AM$$

$$\Rightarrow \frac{BM}{AM} = \boxed{\frac{\delta}{\epsilon}}$$

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$$\frac{|\sin \alpha|}{\cos \alpha} = -\frac{1}{\cot \alpha} \Rightarrow \frac{|\sin \alpha|}{\cos \alpha} = -\left(\frac{\sin \alpha}{\cos \alpha}\right) \quad -10$$

سین مثبت و کسین مثبت است یعنی $\cos \alpha > 0, \sin \alpha < 0 \Rightarrow$

$$\sin \alpha \geq 0, \cos \alpha \neq 0 \Rightarrow |\sin \alpha| = -\sin \alpha \xrightarrow[\text{می تواند}]{\text{فقط}} \boxed{\sin \alpha = 0}$$

$$\sin \alpha < 0, \cos \alpha \neq 0 \Rightarrow |\sin \alpha| = -\sin \alpha \xrightarrow[\text{می تواند}]{\text{فقط}} \text{در ربع سوم و چهارم}$$

$$\Rightarrow \sin \alpha, \cos \alpha = \text{منفی} \Rightarrow \text{در ربع سوم}$$

$$\frac{1}{\sqrt{\cos^2 \alpha}} - \tan \alpha = \frac{1 + \sin \alpha}{|\cos \alpha|} \Rightarrow \frac{1}{|\cos \alpha|} - \frac{1 + \sin \alpha}{|\cos \alpha|} = \tan \alpha \quad 10$$

$$\frac{1 - (1 + \sin \alpha)}{|\cos \alpha|} = \tan \alpha \Rightarrow \frac{-\sin \alpha}{|\cos \alpha|} \Rightarrow \cos, \sin < 0 \quad 15$$

و در ناحیه سوم است.

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